96. Evaluating animal mobility in relation to climate change mitigation: Combining models to face methodological challenges

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Pastoral farming systems are likely to adapt to climate change through animal mobility and thus the potential of available forage resources depending on the season. However, the role of animal mobility in mitigation strategies is not yet known. To understand its role, we investigated major methodological challenges: (i) we addressed the diversity of grazing areas and forage resources mobilized by these systems to estimate methane enteric emissions; (ii) we analyzed the functioning of farming systems based on various combinations of resources use in relation to the assessment of their GHGs and energy requirements (iii) we assessed the impacts on soil and biomass carbon flows caused by grazing practices (carbon sequestration/emission). We developed a methodology based on existing models (OSTRAL and CASA) that we adapted and used in combination. This method was applied to four French Mediterranean farming systems that used mobility differently. Results from OSTRAL model showed that two systems improved efficiency. In the first system, using great quantities of grazing resources from natural areas reduced GHG emissions. In the second system, high animal productivity balanced the increase in GHG emissions caused by feed production. Moreover, CASA model can simulate scenarios of land cover dynamics in natural environments used for grazing. It will help us to assess the impact of grazing practices and thus carbon flows in systems in natural environments. To conclude, this first application shows that the practice of animal mobility off the structural limits of the farm seems engaging to reduce GHG emissions and to improve energy balance.